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PULMONARY
CONSUMPTION:
ITS
CAUSE, PREVENTION & CURE.

BY

JOHN J. HARTNETT, M.D.

London:
E. J. CLAYTON, 4, Pilgrim Street, Ludgate Hill, E.C.
1892.

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PULMONARY CONSUMPTION:

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INTRODUCTORY CHAPTER.

THERE are few subjects in therapeutics of graver import to the practising physician than the treatment of Pulmonary Consumption The number and variety of "Cures" which have been advanced, together with the fact that many recognised authorities hold conflicting opinions on the curability of phthisis, and the inadvisability or otherwise, of attempting any special treatment beyond the administration of tonics and wintering in one orother of the many health resorts recommended to consumptives, warn us that this branch of medical scienceeis still far from being in as settled and satisfactory a condition as we should wish it.

Specialists who have made this disease a study know full well how difficult and perplexing the development of

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complications makes the collection of statistics, and how carefully cases must be watched before exact conclusions can be arrived at. Oftentimes patients make considerable progress for a time, when, from some untoward event such as a slight attack of hæmoptysis or a chill, inducing pulmonary congestion, accompanied by constitutional disturbance, alarming symptoms suddenly supervene, which, temporarily or permanently, retard convalescence.

To my mind the most important point, in the first instance, we have to consider, is, whether consumption is a local disease of the lungs which in time affects the entire body, or whether the system is first affected and the lung disease afterwards developed as a local manifestation of the constitutional disturbance. Many of the leading authorities believe phthisis to be a local disease of the lungs, and as such it calls for local treatment. Pouring doses of nauseating expectorants, large quantities of cod liver oil, and other disagreeable compounds, into the stomachs of patients, in the fond hope that, in some inexplicable way, this form of treatment will eradicate the disease is now happily being superseded by more rational and scientific methods of dealing with this scourge.

The discoveries made by Pasteur and other bacteriologists of the living causes of disease have opened our eyes to the fact that if we wish to effect any good purpose our treatment must not be entirely symptomatic —merely treating the cough and other symptoms as they arise—but must be directed to the destruction and removal of the cause of the disease. Nearly ten years ago it was conclusively proved by Prof. Koch that the origin of Pulmonary Consumption was the presence of rod-shapedbacteria—bacilli—in the lungs. These bacilli resemble animals in their requirements for food, for while a plantwill thrive on carbonic acid and ammonia, the bacilli must have nourishment consisting of the actual substance of the animal on which they live. They act on this food chemically by digestive juices, and strange as it may seem, it is not to the existence of the bacilli themselves, so much as to the foul and harmful excreta they give off, that the greater part of the mischief occasioned by their presence is due. They do not take the food into their insides, but rather wallow in it, acting on it and digesting it as they multiply by millions. The poisonous impurities, or excreta which they throw off, are at first expectorated from the lungs, but afterwards, as the microbes sink deeper into the pulmonary tissue, their excreta are absorbed into the circulation, and produce the distressing train of symptoms —profuse expectoration, night sweats and diarrhœa—which we recognise as peculiar to the second and third stages of pulmonary consumption.

Professor Ray Lancaster, F.R.S. in a recent popular article graphically describes what the excreta of bacteria and their effects are like.

" All bacteria are not alike in their requirements as to food and in the substances—variously smelling, variously coloured, poisonous or harmless, liquid or gaseous—to which they give rise; just as some animals are herbivorous, some carnivorous—as some produce musk, some ambergris, others venom, others wax, and so on—so do we find variety in this invisible world, rendered visible only by the modern microscope. There are kinds—species as the naturalists say—of bacteria as distinct from one another as the cow and the skunk. The commonest species are those which live on ordinary vegetable and animal refuse. They make a good deal of disagreeable smell, but there is not much harm in them, and, like the manufacturing chemists, who, next to bacteria, are of all beings the most offensive to the olfactory sense, they perform valuable service by manufacturing soluble ammonia and nitrates (the food of green plants) from the viscid and solid carcases which once were living. Many distinct species are known which are thus busy—one stage of the process being performed by *Bacterium termo*, the commonest of all, and *Bacterium lineola*, *B. dichotoma*, *B. subtile*, and others, while *B. ureæ* produces ammonia in the course of its operations (witness the stable-yard) and *B. nitrificans* (only just lately isolated and studied experimentally) converts ammonia into nitrates and nitrites, carrying on its work everywhere in the soil and preparing it for the growth of plants."

"We are indebted for vinegar to the chemical activity of *Bacterium aceti*, which grows on the wicker-works of vinegar factories and oxidizes the alcohol, provided by the vinegar manufacturer, into acetic acid; and we have to thank another bacterium for the butyric acid which gives its flavour to cheese. Without these bacteria we should have no vinegar and tasteless cheese. The phosphorescence—not of the sea—but of dead fish, bones, and rotten wood, is due to a bacterium which, in the course of its chemical operations having as their end its own nourishment, produces a peculiar substance, which is oxidized with the production of light but little heat. Some bacteria startle mankind by the brilliant colours they produce, in a wanton sort of way, not apparently because the colours are of any use to them, but just as a by-product of their digestion. All the milk in a village is turned blue, not like the blue of London milk, but a fine ultramarine, by the sudden growth in it of the *Bacteria cyanogenum;* another makes the pus of ill-dressed wounds assume a beautiful emerald green colour, and others cause red, yellow, and violet tints to appear where least expected."

Every surface teems with them; all natural waters are infested by them; even the skin of the most washed of mankind; even the moisture of the sweetest mouth harbours them by the million.

CHAPTER I.

PHTHISIS, Pulmonary Consumption, or Tuberculosis of the Lungs, a contagious disease affecting man and many of the lower animals, is due to the presence of Parasitic Microbes in the lungs.

It comes not as an epidemic affection in spasmodic outbreaks making its presence felt for a time, but is always with us. It is not a rapidly acute affection like many of the fevers, it is more insiduous in its attack, more deadly in its effects. It creeps on like a veiled assassin and takes firm hold on the system before the victim can realise he is grappling with a deadly foe.

The mortality from this affection outnumbers that from any other deasease. It is peculiar to civilised life, and its spread is the outcome of our so-called civilization. Savages who lead an open air vigorous life do not suffer from Pulmonary Consumption; amongst the Maories, the Zulus and the North American Indians it was an unknown disease *until the introduction of civilization.*

That it is communicated from man to animals and from animals to man by the inhalation of the spores and germs to which it is due, the consumption of tuberculosis meat and milk, and by inoculation has been conclusively proved.

The specific germ to which Pulmonary Consumption is due is the Bacillus Tuberculosis, a rod-shaped bacterium of an elongated form, found in the diseased parts of men and animals suffering from Tuberculosis.

It is to badly ventilated, insanitary homes, confined bed-chambers and overcrowding, with insufficient breathing space and defective ventilation that the spread of this scourge of modern times is mainly due.

The germs are harboured in crevices and corners of unclean rooms, in the carpets and curtains of insanitary houses where the pure air seldom and sunlight never

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enters, and undoubtly cause the spread of this disease from one member of a family to another, as surely as the germs of typhus, scarlet fever and other acute fibrile affections do.*

Why, it is often asked, if Consumption is due to the presence of bacilli, is it that some people "take" the disease, whilst others do not, or why does it "run" in some families, and seem to be hereditary, whilst those living in the same district, perhaps in the same house, are seldom or never attacked? The important discovery made by Carl Roser and worked out by Metschnikoff, the Russian zoologist—-to whose ingenious and fertile experiments we owe much of our knowledge of phagocytosis—that the white cells, the amæboid corpuscles of the blood, possess a peculiar property of picking up and dissolving, or else ejecting foreign particles and even those living active micro-organisms which find their way into the circulation, goes far to supply an important answer. He called these corpuscles "*phagocytes*" on account of the properties they possess, and showed that they act on the bacteria in this peculiar way, and are in reality the scavengers of the system, and particularly of the more delicate structures of the body.

From his researches and observations he arrived at the conclusion that it is war to the knife between the phagocytes and bacteria when they meet in the blood, and pointed out that recovery from a bacterial disease means the triumph of the phagocytes, whereas, if death ensues,

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* See case recorded by Dr. B. W. Richardson page [redacted], and by author, page [redacted].

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the bacteria have overcome the phagocytes, and poisoned the whole system with their excreta.

The amæboid corpuscles are very plentiful in the healthy system, both in the blood and in the various tissues of the body, and undoubtedly act as the defenders of the more delicate structures against the inroads of bacteria. It must not be imagined however, however, that these phogocites stand like sentinals on guard waiting for the micro-organisms to appear in the blood, on the contrary their food and very existence depends or the habit of picking up bits of degenerating muscles, bacteria, &c. When, however, from hereditary taint or debility, induced by any cause—such as poor living, typhoid fever, excessive and exhausting work in badly ventilated rooms—the system is so lowered that the phagocytes are abnormally scarce, then the subject becomes predisposed to consumption; that is to say, supposing a number of bacilli are inhaled, and find a resting place on a patch of congested lung tissue, the soil is, so to speak, ready to receive them; the phagocytes, or natural scavengers, not being in sufficient force through the debilitated state of the blood, these bacilli take root, and multiply in such numbers, that the individual soon develops the symptoms of pulmonary consumption.

The presence of an abundance of the amæboid cells in the blood is the greatest safeguard against consumption, and to my mind, their absence would, in a great measure, account for the hold phthisis takes on those fair haired and clear skinned people, who undoubtedly inherit constitutions predisposed to the disease.

The destruction of the bacilli in the early stages of the affection produces a rapid and complete cure. To play with a case until it has taken firm hold of the system would indeed be culpable, when a rational method of treatment, entirely free from risk, can conclusively be demonstrated.

To wait until the lungs are riddled with small cavities; until the entire system is poisoned with the excreta given off by the bacilli, producing night sweats, diarrhœa, etc., or until the ulcerative process has eaten its way perchance through one of the pulmonary blood vessels, and then hope for a rapid or certain cure, would be as irrational as to expect a physician to supply one with a pair of new lungs. We are but human, and must work by human means The more highly organised we are the greater penalties we have to pay, both physically and mentally, for our high organisation.

If you lop off a branch of a tree it will shoot out in a fresh place. Not so, however, with the more highly organised animal: a limb once dead is dead for ever. The surgeon who prevents the gangrenous process from extending, and gives nature a chance of repairing the diseased structures, has done well for his patient. In the same way, once a portion of lung tissue is diseased or dead, we are doing well if we can arrest the progress of the ulcerative process, and bring about a repair of the tissues. From the first, we must treat consumptino not as a constitutional disease, having the lung trouble as a local manifestation, but rather as a purely local affection of the lungs, induced by the presence of a microscopic parasite which thrives best on a moist substance, at an equable temperature of about 100 degrees Fahrenheit, and away from all sunlight.

Such a condition is to be found to perfection at the termination of the smaller bronchial tubes, where they spread out into soft vascular lung tissue—the pulmonary air cells—which are little more than a network of minute capillaries covered over with a layer of delicate epithelial cells, so as to allow of the egress of carbonic acid from the blood, and the ingress of oxygen from the air. Here the bacillus alights on a patch of pulmonary tissue, perchance congested or inflamed. It is inhaled perhaps in a half dead condition, but the warm blood into which it comes in contact soon restores it to animation and activity. It finds a home congenial to its tastes, and begins to multiply by hundreds, thousands, millions, and nonillions. At first the effects on the system are but slight. There is a depression of spirits—as if nature were conscious of the presence of a secret foe—a loss of appetite, a short hacking cough, with little or no expectoration. Examination reveals a slight dulness on percussion, and the stethoscope conveys to the ear the characteristic "click," which once heard can never be mistaken.

At this stage of the disease we have before us an individual, into a cul-de-sac of whose lung some parasitic microbes known as bacilli have been inhaled with the air, perhaps in a ball-room, at the theatre, in a badly-ventilated sleeping apartment, or by the bedside of a dying relative, a slight congestion or hæmoptysis rendering the pulmonary tissue suitable for their reception. To free the lung from these bacilli would be to cure the patient; but, how? Surely, not by sending him home and prescribing a mixture of squills, ammonia, digitalis, syrup and ipecac; not by confining him to his bed in an apartment perchance too small badly-ventilated and devoid of direct sunlight, paying little or no attention to diet, applying a slight counter-irritant to the apex of the affected lung and casually visiting the patient. THAT is *how not to cure,* or even to arrest the progress of the disease, as the records of the hundreds of thousands who have fallen victims to Pulmonary Consumption clearly show.

The symptomatic treatment of this disease is worse than useless; it prolongs the patient's misery but does not cure the disease. To allay the cough by prescribing a morphia mixture: the hæmoptysis by a sub-cutaneous injection of ergotine: the night-sweats by mineral acids, or the diarrhœa by prescribing astringent mixtures is not the true end of scientific medicine. The basis of sound therapeutics must be above all *to attack the cause of the disease directly and destroy it.*

In the treatment of Consumption we must, therefore, bear two points in mind:—

1st.—The hereditary or acquired predisposition characterised by the scarcity of Phagocytes in the blood.

2nd.—The exciting cause—the presence of microscopic parasites—bacilli—in the lungs.

An insufficiency of Phagocytes means an abnormally thin and impoverished condition of the blood, a state of things to be found among clear skinned, anæmic, individuals. We must build up the system by every means in our power, and, as will subsequently be pointed out, this can best be done by supplying such nutritive substances as can readily be assimilated and on which the phagocytes thrive best.

The destruction of the bacilli should, however, be our chief aim; for if these be not exterminated good-bye to all hope of permanently curing the disease. To reach those small microbes buried away in the most remote recesses of the lungs is the problem we have to solve. We know as a fact that the numerous medicines and substances which have from time to time been prescribed to be taken into the stomach or introduced into the blood have little or no effect on the bacilli. Creosote is the only preparation of any repute for that purpose but, alas, this, more often than not, fails to be productive of any good result, and as a matter of fact is a preparation which many people cannot take on account of the peculiarly disagreeable eructations to which it gives rise. How then are we to reach the bacilli and destroy them? The very elements of physiology teach us that air, and nothing but air, is allowed to pass through the smaller bronchial tubes and reach the lung cells. Even small particles of moisture, spray, or the very finest powder floating in the air does not pass much beyond the second or third bifrications of the bronchial tubes. Nature provides a special arrangement of scilliated epithelial cells lining the trachea and larger tubes, with that special object. The scilliæ with which these cells are covered are constantly in motion, always weaving towards the opening into the larynx. Their action has been likened to that of a field of ripe corn when acted on by a gentle wind. The dark coloured expectoration which one notices after travelling in smoky tunnels like the Metropolitan and District Railway in London, is an example of how well and carefully these tiny hair-like processes do their works extracting all the foreign particles in the atmosphere before it reaches the air cells.

We must, therefore, take a lesson from nature, and not attempt to reach the bacilli in the air cells by means of air charged with fine powder, spray or medicated steam. There are certain preparations which are vola, tile—that is to say, they impregnate the air with their peculiar properties without being materially appreciable and pass with the oxygen through the ramifications of the bronchial tubes, coming directly into contact with the pulmonary cells. Some of these volatile preparations are germicidal in their action — they destroy bacteria and disinfect the poisonous excreta given off by them. There are several at our command which vary in their volatilising power and their germicidal action. Some deodorize the air but have no action whatever on the germs. Others, again, though their deodorising power is not great, possess remarkable properties at germicidal agents. Guaiacol, Menthol, Creolin, Iodoform, Eucalyptus, Terebine, and Pine are foremost amongst those agents. Drugs like carbolic acid, though of great value as germicides where they can be applied, are of little use to us in the treatment of consumption, their volatilising power being so low. We now find ourselves reduced to devising some means of charging the air with the best volatile germicidal inhalant known, and, if possible, assisting nature in bringing the air so charged into close and constant contact with the bacilli in the air cells of the lungs. The best means of doing this I shall endeavour to point out in the following chapter.

CHAPTER II.

BEARING in mind the peculiar situation of the microbes in the air cells at the termination of the bronchial tubes, and the fact that nothing but air reaches thus far into the lungs, it must be at once apparent, even to an obtuse mind, that the most rational means of reaching the bacillus in his new home is by charging the air with some volatile preparation in which it can be demonstrated that the microbes cannot live.

This opens up the question of inhalation. I have been told that inhalations have been tried, and have failed to cure pulmonary consumption. This, however, is only partially true. Up to now, the system of inhalation adopted, even at our leading institutions, specially maintained for the treatment of consumption, has been so imperfect, that it has deservedly fallen into disrepute. The inhalers have generally been tin kettles or earthenware jars with pipes attached for giving off steam, medicated by the addition of a little carbolic acid or creosote. Steam as a means of conveying medicaments to the respiratory tract in cases of pulmonary consumption is utterly useless; for the watery vapour is condensed, and the medicament it contains is deposited on the trachea or larger bronchial tubes long before the air reaches the smaller ramifications of the tubes or the lung cells.

Medicaments given off from spray producers share the same fate, and are mostly deposited on the pharynx. Besides, the warm moisture of steam is rather favourable to the development of the bacilli. Therefore, in treating consumption, we must discard every form of apparatus, or so called inhaler, which gives off steam, watery vapour, or spray, in any shape or form.

Again, when we come to consider the inhalants in use, we find first on the list carbolic acid. Now, carbolic acid put on an ordinary dry inhaler or respirator simply remains there, that is, to a very great extent, for it is but sparingly volatile at the ordinary temperature of the atmosphere. Dr. Hill Hassell proves that a very large proportion of the carbolic acid, creosote, &c., can be recovered from dry inhalers, even after they have been in use for days. To thoroughly charge the air, we must use inhalants more volatile than creosote or carbolic acid.

The introduction of Menthol, Eucalyptia, Pinol, Guaiacol, Terebine, Myrtol, Creolin, Iodoform, &c., has quite revolutionised inhalation treatment, and with more perfect dry inhalers we are now able to accomplish most satisfactory results.

It remains therefore for me to point out what means I have employed and how I have employed them in achieving such satisfactory results in the treatment of pulmonary consumption, bronchitis, and asthma. In the first place I find that to be productive of any good results in the treatment of laryngeal, bronchial, or pulmonary affections the inhalation of medicated air must be constant, that is to say, the patient must practically live in an atmosphere charged with the inhalant when indoors, and use a pocket inhaler as much as possible out of doors. To charge the sleeping and other apartments by night and day with pure dry medicated air, I force the atmosphere by means of a small fan through a medicating chamber, in which the volatile inhalant is placed. By this means not only are all noxious exhalations absorbed, but a free blast of antiseptised air is

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given off from the exhaler, and the atmosphere indoors keep pure and charged with the inhalant. For this purpose I cannot too strongly recommend a preparation known as "Ozol," which is composed of a distillation from the Alpine Pine (*pinus pumilio*) Eucalyptus, Terebine, Guaiacol, Oil of Cinnamon, &c. The atmosphere, in a dry state, can be thoroughly saturated with this excellent inhalant, which is volatile, pleasant to inhale, germicidal in its action, and undoubtedly possessed of great healing properties when brought into contact with the diseased pulmonary tissue.

Besides sleeping in an atmosphere of medicated air, some local lung treatment of a more pronounced character is called for. The germicidal air must be administered in stronger doses and in a more concentrated form for twenty or thirty minutes, at intervals of one, two or three hours during the day. When patients reside in an establishment in which is fitted up the condensing apparatus, devised by the author, with reservoir attached, from which sufficient air to thoroughly inflate the lungs can be forced, under a pressure of one and a half or two atmospheres, through an ordinary nose and mouth piece, during inspiration, no difficulty need be experienced in carrying out this local lung treatment.

From force of circumstances and other causes many patients will be compelled to carry out the treatment in their homes, where the more expensive apparatus will not be procurable. The Pulmonary Insufflator, which I have devised, is a portable hand instrument and improved inhaler, which not only does the work of medicating the air, but also forces it into the respiratory tracts during inspiration, will, I hope, supply the want.

The following extract from my Paper on the "Insufflation of Medicated Air," read before the Larnygological Section of the British Medical Association, at Birmingham, 1890, contains a full description of the instrument.

The therapeutic value of volatile medicaments in the treatment of diseases of the respiratory organs being now established beyond all question, and the beneficial results accruing from their administration in such serious lung diseases as Asthma and Phthisis being fully recognised, we only need some form of appliance to facilitate the introduction of these valuable preparations into the bronchial tubes and lungs, to enable us to derive still better results from their use.

Having devised an instrument which possesses many advantages over the ordinary inhaler, and which supplies to no small extent those important features which should be the recommendation of a good apparatus for the introduction of volatile medicaments into the respiratory tract, I have named it the "Broncho-Pulmonary Insufflator." This being the first time that the term Insufflator has been applied to any form of inhaler, it may not, perhaps, be out of place to point out that the term, as applied to an instrument in use for blowing powders into the throat, is a misnomer, for insufflation, according to Fowler,* is "the act of blowing air, gas, or vapour, into a cavity of the body." I may therefore claim for my apparatus that it is in the true sense of the word an Insufflator, for nothing but medicated air comes from the mouthpiece.

The chief advantages in its favour are—

(*a*) By simply squeezing the bag a draught of air is forcibly drawn through the fluid contained in the medicating chamber, and is blown from the mouthpiece into the respiratory tract, without any extraordinary inspiratory effort on the part of the patient. It will be at once apparent that this is an enormous gain, not only in ordinary cases of throat and chest disease when invalids find inhalers fatiguing to use, for it must be borne in mind that these instruments are not ordered only for a few minutes, then to be put aside and taken up again, according to the whim of the patient, but rather are intended for constant use until they afford relief. Therefore, I recommend this apparatus, which so to speak, does the work of medicating the air, and saves the patient the fatigue of sucking or drawing it through the inhaler, as a most effectual means of treating diseases of the throat and lungs by the insufflation of medicated air.

(*b*) The large chamber is capable of holding a sufficient quantity of medicament to thoroughly saturate the air as it bubbles through the liquid contained therein.

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* See "Medical Vocabulary."

(*c*) Drugs, such as carbolic acid, creosote, &c., which do not volatilise at the ordinary temperature, and, consequently, are comparatively useless when used on respirators and dry inhalers, readily volatilise in the Insufflator chamber when mixed with hot water.

(*d*) The second chamber admits of two incompatible inhalants being used at the same time (one being dropped on the sponge in the dry chamber, while the other is put into the bottle).

(*e*) The air comes from the glass mouthpiece charged to the fullest extent with the therapeutic properties of the volatile drugs, but never in the form of steam, watery vapour, or spray. A good mouthpiece is preferable to the oro-nasal apparatus, which undoubtedly impedes respiration and serves as an accumulator for the poisonous exhalations of phthisical and bronchial patients. Inhalation should take place through the mouth, the nose being left free for exhalation, the result being that there is a perfect freedom of respiratory effort, so valuable in Phthisis, Emphysema, Bronchitis, &c., besides, the poisonous products contained in the exhaled air cannot be inhaled over again.

The apparatus, which consists of a pneumatic chamber or bag, and a compound medicating chamber, is best used by placing the bottle on a table or convenient stand, taking the rubber bag in the right hand and placing the mouthpiece well in the mouth with the lips closed upon it. The bag is then to be firmly squeezed, and the medicated air blown into the throat, over the

epiglottis, into the open larynx during the act of inspiration.* When the lungs are thoroughly filled and exhalation commences, *expiration should take place through the nose.* The time required for exhalation will be sufficient for the bag to refill itself (the air being drawn through both medicating chambers) and be ready for use at the beginning of the next inspiration. *It is particularly requested that no effort be made to draw the air through the mouthpiece, the only exertion required being that of taking a deep inspiration when blowing the air from the Insufflator.*

About half the bottleful of hot water may be added when it is desirable to warm the air and increase the volatilising power of the drugs. The preparation ordered with the instrument is to be dropped into the bottle, and the cork firmly pressed down. Continue the insufflation for ten minutes, and repeat this treatment four or five times at stated intervals during the day, in the morning after dressing, about mid-day, an hour or two before dinner, and at bed-time.

For cleansing the larynx and vocal cords, and promoting strength and clearness of the voice, other modes of treatment come second to insufflation. It is so simple and rational that it cannot but commend itself to those interested in voice production, as well as for the treatment of bronchial and pulmonary affections. The lining membrane, the epithelium, is here more delicate than in any other part of the body. The cells, which are so beautifully fine with their covering of ciliated processes (whose function is to arrest and expel atoms of dust and foreign matters contained in the air, so that irritating particles shall not reach the lung-cells) cannot be brought under the immediate influence of medicines in any better way than through the air, neither liquids nor solids being allowed to enter the air-passages. Medicated fumes, steam, and cold water sprays, are not so likely to come into contact with the pulmonary tissue as dry medicated air, to which there is no resistance offered.†

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* A good plan for working the bag is to rest it on the table, or against the right hip.

The effect of air charged with the volatile extracts of the Pinus Sylvestris and Pinus Pumillo is so universally acknowledged to be productive of good results in the treatment of bronchial and pulmonary affections that I strongly recommend some of the preparations of Pine, either separately, or in combination with other inhalants. The air can be thoroughly saturated with the volatile extracts, and blown into the respiratory passages by using Pinol (~~Burroughs~~ B.W.&Co), Ol. Pini Sylvestris, Pumiline, or Mack's Essence of Pinus Pumillo, with hot water in the Insufflator.

London, with all its advantages, has many serious drawbacks in the way of fogs—the atmosphere, for several months in the year, being most trying to live in. If life in London and other large cities means the constant inhalation of air full of carbonaceous and sulphuretted matters, which are deposited on the lining membrane of the bronchial tubes, it behoves individuals (especially those predisposed to consumption) to keep the breathing apparatus in a healthy condition, for when the lungs and respiratory passages "go wrong" the end is not far off. The dark-coloured sputa which one notices after travelling on the underground railway is but a sample of what is left deposited in the bronchial tubes.

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† It has been ably pointed out by Dr. Theodore Williams, that when steam or spray is the vehicle of medication, the drugs used "are but slowly absorbed by the lungs, and enter the circulation in small quantities—in some cases not at all." Therefore no steam, watery vapour, or spray should come from a perfect *dry* inhaler.

A stimulating volatile inhalant remedies this. Twenty drops of pure Terebene, twenty of the Aromatic Spirit of Ammonia, with a few drops of Pinol or Eucalyptia added, used in the Insufflator for five minutes every morning thoroughly clears the bronchial tubes and wonderfully improves the voice for the rest of the day. So much so, indeed, that every well-appointed dressing-room should have an Insufflator for use before and after dressing, or at least twice a day. This I recommend as a safe and easy means of preserving the voice, and keeping the respiratory passages healthy and free from accumulations of mucus or muco-purulent secretions.

For increasing the resonance and improving the tone and strength of the voice there are several useful medicaments at our command. The free Oxygen which is given off when the air bubbles through a solution of Peroxide of Hydrogen * in the Insufflator, is invaluable for voice production. Combined with this, or used separately, I prescribe a solution which should be a clear volatile

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* Hydrogen Peroxide (10 vols. strength) may be obtained, ready for use, from Messrs. Allen & Hanbury, Corbyn & Stacey, or other leading Chemists.

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preparation of Ammonia, Terebene, Pine, and Eucalyptus. This solution may be used in the large chamber, or 20 to 30 drops can be poured on the sponge, and half the bottleful of Hydrogen Peroxide used in the liquid chamber. By charging the air with the oxygenated products which are given off, and subsequently blowing it on the vocal organs, a surprising improvement takes place in the quality and tone of the voice.

To complete this system of medicated air treatment, from which I have obtained such excellent results, I have but to introduce my little pocket inhaler intended for use out of doors. This little instrument is I think, as perfect as any to be had. One of its great advantages is that it can be carried fully charged with the inhalant, always ready for use by simply unscrewing the vulcanite cap which covers the mouthpiece. The quantity of medicated air inhaled can be regulated by an arrangement at the end which admits a quarter, half, or full draught as required. For most throat and chest affections I strongly recommended this little inhaler charged with suitable inhalants according to the nature of the case and the advice of the physician in attendance, to be constantly used out of doors. It is not unsightly like some of the respirators in use, and can be inserted in the mouth and carried like a small cigar when walking, driving, at the city office, or when doing one's ordinary work. It possesses another great advantage, viz.:—that the absorbent medium being flannel it acts as a perfect filter against fogs or noxious gasas, and purifies the air as it passes through.

The inhalant "Ozol" is far in advance of any other preparation for the cure of consumption, not only on account of its high volatilising power, its powerful germicidal properties, and its antiseptic action on the bacillor excreta in the lungs. It contains a large proportion of Guaiacol (beech creosote). This has many advantages over ordinary Creosote, which is apt to be substituted for it by the unscrupulous chemist on account of the great difference in price.

Having thus briefly sketched my system of inhalation, or rather insufflation treatment, by which I have successfully treated the cases which have come under my care, I wish particularly to draw attention to the utter uselessness of attempting to do any good by carrying out this treatment in an incomplete or half-hearted manner. Unless it is cheerfully taken up by the patient with the determination to persevere for a few weeks or months at least, according to the nature of the case,—for slight cases of incipient phthisis soon get well—and thoroughly advocated by the physician, the

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result will probably be that one case more will go to swell the death roll of those who fall victims to the ravages of the Bacillus Tuberculosis.

It is a fact of great importance to the physician, that whilst many varieties of bacteria are extremely tenacious of life, and difficult to destroy, the tubercle bacilli are readily killed. Extreme heat is often the only reliable means of destroying many kinds, whereas volatile germicide, above mentioned, or even exposure to sun light for a few hours will kill the bacillus tuberculosis.

If these microbes were on the surface of the pulmonary tissue, it would be easy enough to destroy them wholesale, but no sooner do they commence active work than they bury themselves in the substance of the lungs, forming little colonies surrounded by an almost non-vascular portion of tissue—a specific tubercular nodule—the milliary tubercle.

To dislodge the bacilli from these tubercles is our greatest difficulty.

From time to time, however, these tubercles break down, leaving an exposed surface swarming with bacilli, and when several break down in the immediate vicinity of one another, a cavity is formed. At first the tubercles are very small, and scattered over the portion of lung affected. If therefore, we are prepared with the treatment herein advocated when the bacilli are exposed to its action, we destroy the colony of them there and then, and prevent the spread of the disease.

CHAPTER III.

Though regarding the inhalations of *dry compressed medicated air* as the only rational means of destroying the primary cause of consumption of the lungs—the Tubercle Bacilli—and believing that this method of treating the disease will unquestionably yield immediate results, if thoroughly carried out on the grounds laid down in the preceding chapter, I do not, nevertheless, pay little attention to the hygienic and dietary rules which must be rigidly observed by all who wish to battle successfully against this insidious disease. Muscular exerciee in the house, as well as in the open air, is a matter of great importance to the consumptive invalids. The maintenance of the atmosphere in the living and sleeping apartments at an epuable temperature, by day and night, is a point of great importance in acute cases, and the thorough ventilation of the rooms and purification of the air by means of volatile antiseptics, is almost a *sine qua non.*

In the treatment I advocate, Tuberculine might be made considerable use of as a means of causing the rupture of the tubercles, and the consequent exposure of the bacilli to the germicidal air. We all know full well that tuberculine does not directly destroy the bacilli.* It acts rather on the tissue surrounding the tubercle, of which it causes the ulceration, dislodging the bacilli from their homes and exposing them, and the toxin with which they are surrounded to the action of medicinal agents, which should then be available for their destruction. In the case of external tuberculosis, most valuable results might be gained by locally treating the ruptured tubercles, after tuberculine injections, with suitable germicidal ointments. So also, in pulmonary consumption, can valuable results be gained in suitable cases by the injection of small doses—three to five decimilligrammes—to cause the rupture of deep seated tubercles in the lungs, and the consequent exposure of the contained bacilli to the action of insufflated germicidal air.

The diet of patients suffering from pulmonary consumption is a point of vital importance. It must be nourishing, not too rich in fats, as these often tend to upset the digestive organs, the old fashioned notion of administering large quantities of cod liver oil being indeed a great mistake, as it invariably passes through the bowels when more than a dessert spoonful or small tablespoonful is administered three times a day. By light, nourishing food we must compensate for the waste going on in the lungs, build up the system, and increase the number and strength of the phagocytes in the blood.

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* See Professor Ehrlich's Paper, *Lancet*, October 24th, 1891, abstracted by Thomas Whiteside Hume, M.D.

For this purpose I have found from experience nothing can equal fresh goats' milk diluted with a small quantity of lime water. The effect of this easily obtained but excellent article of diet for consumptive patients has only to be tested to prove the astonishing results which accrue from its use, the flesh and blood of the goat being also used as articles of diet. It is worthy of note that *goats do not suffer from consumption.* Whether this is due to the peculiarly open-air lives these hardy little animals lead, or to some inherent power, such as the presence of active phagocytes in the system, remains to be proved. Be that as it may, the milk of the goat is, without exception, the best food for consumptive invalids. It is light, easily digested, and contains strengthening properties of great value. Two or three quarts should be consumed in the day, and when possible, should be had fresh from the animal. A plentiful supply of fish, oysters, when in season.

With this special diet, the patient should indulge in as much exercise as possible, both in and out of doors. Dumbell exercise with rubber springs, dry rubbing, and artificial horse exercise indoors. Horse exercise, quick walking, sculling, cycling, &c., out of doors, the one great precaution being, never to get thoroughly tired out. The patient should keep in the sunlight, and as free from damp as possible. To the consumptive invalid, the good old advice of "early to bed, and early to rise," is golden. Needless to say, each case, according to the nature of the disease, temperament of the patient, circumstances in life, family history, &c., &c., will require special advice, exact rules of diet, and recommendations as to exercise, from the physician. For many cases, I strongly recommend a mild electric current, either in the form of an electric bath, or applied direct to the chest walls two or three times a day.

The importance of sunlight in the treatment of consumption can be imagined, when we know for a fact that bacilli are readily destroyed, not only by direct sunlight, but even by transmitted light.

In her "Notes on Nursing," Miss Nightingale lays particular stress on the importance of light to the sick. The truth of these observations is great, and should be remembered by those attending to consumptive invalids. She says:—

"Second only to fresh air, however, I should be inclined to rank light in importance for the sick. Direct sunlight, not only daylight, is necessary for speedy recovery: except, perhaps, in certain ophthalmic and a small number of other cases. Instances could be given, almost endless, where in dark wards or in wards with a northern aspect, even when thoroughly warmed, or in wards with borrowed light, even when thoroughly ventilated, the sick could not by any means be made speedily to recover.

" Who has not observed the purifying effect of light, and especially of direct sunlight, upon the air of a room? Here is an observation within everybody's experience. Go into a room where the shutters are always shut (in a sick room or a bed room there should never be shutters shut), and though the room be uninhabited, though the air has never been polluted by the breathing of human beings, you will observe a close, nasty smell of corrupt air—of air, *i.e.*, unpurified by the effect of the sun's rays. The mustiness of dark rooms and corners, indeed, is proverbial. The cheerfulness of a room, the usefulness of light in treating disease, is all-important.

" Heavy, thick, dark window or bed curtains should, however, scarcely ever be used for any kind of sick in this country. A light white curtain at the head of the bed is, in general, all that is necessary, and a green blind to the window, to be drawn down only when necessary."

" 'Where there is sun there is thought.' All physiology goes to confirm this. Where is the shady side of deep valleys, there is Cretinism. Where are cellars and the unsunned sides of narrow streets, there is the degeneracy and weakness of the human race—

mind and body equally degenerating. Put the pale, withering plant and human being into the sun, and, if not gone too far, each will recover health and spirit.

"It is a curious thing to observe how almost all patients lie with their faces turned towards the light, exactly as plants always make their way towards the light. A patient will even complain how it gives him pain lying on that side. Then, why do you lie on that side? He does not know, but we do. It is because it is the side towards the window. A fashionable physician has lately published in a Government report that he always turns his patients' faces from the light. Yes; but Nature is stronger than fashionable physicians, and depend upon it she turns the faces back, and towards such light as she can get. Walk through the wards of a hospital, remember the bedsides of private patients you have seen, and count how many sick you ever saw lying with their faces towards the wall."

In the opening chapter of that valuable work, "Our Homes: and how to Make them Healthy"—*edited by* Shirley Foster Murphy—Dr. Benjamin Ward Richardson gives a remarkable instance of the influence of impure air in the production of pulmonary disease. The facts speak for themselves, and conclusively show how all-important the condition of the atmosphere indoors is to the patient, even when the greater portion of the day is spent in the open air. In a little work of this sort, specially written with the object of drawing attention to the best means of reaching the seat of the disease of Pulmonary Consumption, and pointing out the good results to be achieved by the constant inhalation of an atmosphere pure and charged with volatile antiseptic inhalants, I make no apology for quoting so eminent an authority, who proves, on the other hand, how injurious are the results of an impure atmosphere.

Dr. Richardson says:—

"One of the most fatal of our English diseases, Pulmonary Consumption, or consumption of the lungs, has been largely promoted by the presence of unchanged and impure air in the dwelling-house. This fact has been so often observed, that it has led some to believe that Pulmonary Consumption is infectious under certain circumstances, and that living in a room where a consumptive person is also living, may be serious in its consequences to those who are healthy. I have myself shown that consumptive persons who have lived in the same apartment have successively become affected by the disease, the following being, perhaps, the most striking of these facts:—A man, by business a hawker, a "cheap Jack," who was accustomed to live with some other members of his family in the van in which he travelled from fair to fair, and from which he sold his wares, was brought to me in the third stage of Pulmonary Consumption. He soon succumbed to the disease, and was succeeded in business by his brother, who followed precisely the same line of life, and came to live in the same van. His brother soon afterwards became consumptive, and died. He, in turn, was succeeded by his sister's husband, who shared the same fate; and, not to extend the narrative to an undue length, in the course of seven years I had before me no fewer than nine victims of the fatal pulmonary disease, in every one of whom it seemed to originate in that particular travelling-van. It was in vain I protested to those afflicted against continuing to live under conditions so favourable to disease. They argued that they were constantly in the open-air by day, that they got regular change of air, that they were not exposed to wet, and that at night they were snug; in short, they would not believe that sleeping in the van-house had anything whatever to do with the disease.

"The observation of a series of facts such as these may at first sight seem to convey the notion that the poison of the disease was conveyed in the van, and was communicated from one series of its occupants to the next. The evidence is not conclusive. The first sufferer had bought the van new, and first occupied it; he, therefore, did not get the disease by a process of continuation. The van was afterwards regularly emptied, cleaned, newly-painted, and exposed to the air, so that the probabilities of the continuance of specific communicable poison in it are most remote. The practical truth is, however, none the less valuable that the disease originated so many times under the same conditions, and truths of this kind cannot be too often related.

"On a large scale the fact of the influence of impure air in the production of pulmonary disease was fully brought out in the Report of the Army Commission in 1858, respecting the life and health of our soldiers quartered in England. Before the appearance of the

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Report, and for some time afterwards—until, indeed, the recommendations of that Report were acted upon—the health of our home-quartered soldiers was so bad that their mortality was actually double what it ought to have been. The rate of mortality in the effective men of all ages of the army at home was 17·5 in the thousand. At the same time the rate of the mortality of the town and country population at the same ages was 9·2 in the thousand, while that in the country districts only was 7·7. In the population of one of the most unhealthy towns in the kingdom—namely, Manchester—the mortality was then very high; but even in this selected spot of unhealthiness, it was only 12·4 per thousand of persons of the same ages, compared with the 17·5 of the soldiery.

"Here was, then, a most remarkable series of facts, in which contrasts of the most singular kind were established. Nor did the contrasts end as above stated. The soldier's life was a selected life, and ought, therefore, to have been better than that of the civilian of the same age. It was manifestly worse, and so the reporters were led to a further analysis.

* * * *

"At last they came upon one cause which they could not exclude, which, in accordance with the Newtonian saying, was both true and sufficient cause to account for the phenomenon. That one cause, or rather that series of causes, was overcrowding, insufficient ventilation, and nuisances arising from latrines and defective sewerage in barracks. *A single agent, vitiated air,* acted with such intensity, especially when superadded to a certain degree of exposure—as not only to produce in the foot guards an amount of chest disease, and especially of Pulmonary Consumption, greater than was produced in civil life by all the other causes united, but actually to carry off annually a number of men nearly equalling in the infantry, and actually exceeding in the Guards, the number of civilians of the same age who died from all classes of disease.

"One final observation crowned this research of the Commission of Inquiry. The Commissioners compared the mortality of the army when it was hutted before Sebastopol in 1856 with that of the troops at home, and discovered that the mortality before Sebastopol was nearly one-third less than the mortality of the infantry of the line, while it was two-fifths less than that of the foot guards barracked in England. The mortality of the army before Sebastopol during twenty-two weeks, ending May 31st, 1856, was, including deaths by violence or accident, at the rate of 12·5 per thousand per annum, as against 17·9 in the infantry, and 20·4 in the Guards quartered in England.

"The records of these observations is the best and most forcible, because most extended and accurate that has ever been supplied respecting the influence of confined air in the living and sleeping apartments of men who are accustomed even to an active life, and to the enjoyment of much out-door life. If I, or any other physiologist, had desired to carry out a great experiment in order to inquire how diseases of the lungs might be artificially induced in men who had been healthy up to the time of experiment, we could not have devised any method that would have led to a series of results more striking and more convincing. Neither could we possibly have concluded our experiment more satisfactorily than was done in the recommendations of the Commissioners. They recommended that an entirely new system should be introduced into barrack-life; that air, fresh and pure, should at all times circulate through the buildings, and especially through the dormitories; and that every soldier should have efficient and sufficient breathing space. Since these regulations have been in force, the English soldier at home has no longer the unenviable position of being first in the ranks of those who fall victims to Pulmonary Consumption and other affections of the respiratory organs, but is rather the model of a lower mortality; so that as the gaols, once the foci of fever, are at this time the most free of that disease, the barracks, once the foci of consumption, are now the most free of that destroying malady. Here we see a scale, as it were, of disease. In the gaol in its very worst condition of foul air, the disease typhus was the scourge; in the barrack with foul air, but less foul, consumption was the scourge; pure air being substituted in both places, both diseases have been enchanted away. Lessons such as these should never be cast aside, and they apply with the most telling force to our present work. In many of our best houses—I mean best in relation to their appearance and cost, not in respect of their construction—the errors which were common in the barrack are still present, and rooms are used as sleeping rooms which stand in the eyes of the sanitarian like so many experimental boxes for the synthetical development of pulmonary disease. The room is too small; the room is devoid of a fireplace; the room is devoid of a ventilator; the room has a window that will open with difficulty, and at best but a little way; and yet that room is used as a sleeping room for one, or it may be two, persons. These are the rooms in which they who are disposed to pulmonary affection find their early fates; these rooms are the vestibules to the grave."

CHAPTER IV.

SOME REMARKABLE FACTS CONNECTED WITH THE CONTAGIOUSNESS OF CONSUMPTION. REPORT OF CASES.

HAVING briefly hinted at the causation of pulmonary consumption, and accepted the bacillar theory, we muse take advantage of the great discoveries made by thost bacteriologists, who have undoubtedly placed us on the right road to arrive at a correct, scientific, and satisfactory treatment. Following up the discoveries made, and bringing common sense to bear on the question, we arrive at conclusions which cannot fail to assist the practical physician, not only in curing individual cases, but in—what is of still greater importance—effectually checking the spread of the disease. Consumption being due to the presence of the bacillus tuberculosis, is necessarily a contagious disease, for these little rod shaped microbes often become detached from the sputa of patients, get blown about in the air, and on small particles of dust, and are inhaled. The prevalence and virulence of this affection in some districts—such as Thati, the South and West of Ireland, parts of Brittany and the low-lying and damp districts of Germany and Holland—can be easily accounted for by the dampness of the homes in which people live, the want of proper ventilation and sunlight in the cabins of the poor, and a peculiar moist warmth of the atmosphere incidental to the climate or due to the peat fires and thatched roofs. Plenty of fresh air, a dry soil, and as much sunlight as possible, are the first points to be attended to, both in the prevention and cure of consumption. The destruction of sputa should be carefully attended to by those who attend to consumptive invalids, a small hand spitoon containing some suitable disinfectant being kept specially for the expectoration. All pocket handkerchiefs should be well boiled in the process of washing.

A very remarkable case was related to me some time since by a dentist practising at St. Leonards forcibly illustrating the contagiousness of phthisis. He assured me that he knew a clergyman, a Methodist, who resided at Plymouth, and who had married no less than five times. In each case the bride was healthy and free from any taint of consumption. It seems, however, that this parson, with such pronounced matrimonial tendencies, suffered from what we call chronic phthisis. His first wife soon contracted the disease, to which she succumbed in less than two years. The second, whom he married soon after, also became consumptive and died, and so on, until the lady who had the courage to become No. 5 found to her cost that she was likely to follow the others. At this stage, however, the reverend gentleman succumbed to the disease, leaving his fifth and last wife to follow him in less than six months.

Given a badly-ventilated and small sleeping apartment in which those healthy women slept with this consumptive individual, inhaling the foul gases given off from his diseased lungs, and we find a perfect death-trap from which it would have been almost a miracle if one of them had escaped.

Comparatively bad cases improve marvellously in a short time without any special medical treatment when removed from insanitary surroundings and an ungenerous diet to a home where the principles of hygiene are attended to and the supply of food is good and nourishing. Some time ago, when visiting the Brompton Hospital with one of the staff, I was forcibly struck by one case which had put on nearly a stone in weight in a few weeks, and was making a rapid recovery. The physician was proud of the case and assured me that she had undergone no special medical treatment, and that many patients recover at the Brompton Hospital without any. The explanation was not very difficult. The girl told me that she was 18 years of age: had been a general servant in the East End, up early in the morning and retiring to bed late at night, food consisted principally of bread and tea with a little fish for dinner occasionally; she slept in an attic where she felt cold and miserable. Having been removed to a cheerful ward of the Brompton Hospital, given a warm and comfortable bed, abundance of good and nourishing food and having her mind free from worry, she soon put on flesh, the hacking cough daily grew less, the dulness on percussion over the apices of the lungs vanished, the glassy stare left her eyes. In my mind I could not help picturing the glorious work the phagocytes, strengthened by the good food and healthy surroundings, were doing in her system, devouring the bacilli by thousands daily. This poor girl had been saved in the nick of time, before the lung tissue had broken down and before the latent vitality within her had become exhausted. It was one of the grandest cases I have seen where Nature effected a cure without the aid of physic. This was a case of consumption where the insanitary surroundings and starvation rendered it impossible for the system to resist the inroads of the bacilli.

A different class of case and one that forcibly illustrates how little reliance can be put on change of air and improved surroundings as a means of treatment, when taken separately, occurred in my private practice last year. I was called in at the eleventh hour to see a young man (*œt.* 35), the junior partner in a well-known firm of London solicitors. Mr. —— had consulted some of the best men in London, amongst others Drs. Broadbent and Douglas Powel, both of whom had pro-ounced the case beyond hope, indeed the latter gentleman informed him that he could not live six weeks. He had wintered at St. Moritz where he was attended by Dr. Holland at the Hotel Kulhm. Everything that could be done in the ordinary course of treatment was had recourse to; a carefully, well-regulated diet, tonics, hypophosphites, and a winter in the clear bracing air of St. Moritz failed to arrest the progress of the disease. In August, 1890, I was requested to attend him and found both lungs extensively diseased, the apices infiltrated with tubercles, together with a breaking-down to tissue and a cavity in the right about the size of an egg, situated between the third and fifth intercostal spaces. The expectoration simply swarmed with bacilli; there was a rise of temperature, but an absence of diarrhœa and night sweats.

There was in this case a loss of hope of recovery (a most unusual occurrence, as consumptive patients are generally hopeful to the end). Having explained the gravity of the case to his friends, and the remote probability there was of rescuing the patient, I determined to give him a chance. He was provided with a pulmonary insufflator and inhalant of Eucalyptia, Pinol, Guaiacol, and Terebine. This was used in the insufflator, and was frequently sprayed throughout to living and sleeping apartments.* The diet was generous and good, but goats' milk was not used. For the first few weeks there was no marked change. The patient, however, expressed himself more cheerfully, and remarked that he felt pleased to find that he was "doing something for himself." (If this insufflation treatment had no other recommendation than that it provided these unfortunate invalids with something to occupy their minds, it would be in itself a boon to them.) The first marked improvement I noticed was that the voice became stronger, the short hacking cough gave place to a cough which came on only at long intervals during the day, and, indeed, did not occur for several hours after the first attack in the morning.

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* I had not then devised the Exhaler, which gives off a constant blast of medicated air, and absorbs any atmospheric impurities.

Dr. ——, of the London Hospital, who was then examining the sputa of patients undergoing injections of Koch's lymph at the Throat Hospital, Golden Square, kindly examined several specimens of the sputa for me, and declared that then (after three months' treatment) he could not detect any bacilli. At this time the severe winter of '90 had fairly set in, with its terrible London fogs and snow. My patient, who was feeling much better, determined to go a little his own way—thinking he then knew quite well what to do for himself—and decided to spend the winter in London, which he actually did, at his home in Notting Hill until March, when he foolishly went to Brighton. There the excessively cold March winds brought on an attack of congestion with a constant hacking cough, which eventually induced an attack of Hæmoptysis, for which he was treated by a local practitioner. Contrasted with the foregoing case, this one forcibly illustrates how futile it is to place implicit reliance on change of air to a bracing health resort, improved diet and tonics, as this patient had at St. Moritz, without some local lung treatment.

In the one case we have a patient reduced by want and insanitary surroundings to such a state of constitutional weakness, that her system could not resist the bacilli; but from the moment her surroundings were improved, and a plentiful supply of good food administered, nature asserted herself, and the bacilli were exterminated. In the other case, however, we have a patient without any constitution to work on, with insufficient vitality, and an absence of recuperative power, so much so, that though his surroundings were the most perfect, with a clear bright atmosphere at St. Moritz to live in, a generous nourishing diet, and the most able medical attendance, these were insufficient in themselves to cause the complete destruction of the bacilli, and some extra treatment was called for, which would help in destroying locally what the phagocytes were unable to do unaided.

In 1884, whilst attending a gentleman, Mr. S——, who then resided in the Priory Road, Clapham. He informed that the lady who acted as his housekeeper had been suffering for some time from consumption, had given up all regular medical treatment and was then trying some quack preparation for which she paid the exorbitant price of 11/- a bottle. This villainous decoction she swallowed four or five times daily with the desperation of a dying woman clutching at a last chance—

for what will consumptive patients not try—anything; anything for a last chance. The honest general practitioner shakes his head, he has given everything recommended in the text-books, the wise consultatant agrees with the diagnosis, prognosis, and as an improved treatment suggests a long sea voyage, or a winter spent in Egypt or the South of France. We all know how sad it is to see the face of a poor invalid to whom such luxuries are impossible.

Mrs. P—ce was then twenty-eight years of age, had five children alive and had recently lost her husband She was completely broken down in health through worry, exhaustion, etc., when her "chest became weak." At the time I first examined her she was able to rub along in a sort of a way, attending to her household duties and conducting correspondence and keeping books for Mr. S——. On examination the chest walls were found to be extremely thin; the little frame was run down to the lowest. There had been some slight blood-spitting, and the dulness on percussion and crepitation were marked over the apices of both lungs

I told her employer, who had also been the friend of her husband, that she was in a very critical state, and that in all probability six months would be as long as she would last. He implored me to do my utmost for her. For a week or ten days I put her on the then recognised treatment, building the system up as best I could with Devonshire cream, fresh eggs, beef-tea, Van Houten's cocoa, some good port and Burgundy, etc., etc., and administered internally hypophosphites with other tonics. After a month's treatment little or no progress was made and the November fogs coming on my patient was obliged to keep to her bed till twelve or one o'clock in the day. Koch's discovery of the tubercle bacillus was then much spoken of and though inhalation treatment was not in good repute—due entirely, as I explained in Chap. I., page , to the use of steam as a medium for conveying medicaments to the respiratory tract—still I determined to try the effect of dry inhalation on my patient. With this object in view I used an inhalant composed of Ol. Eucalypti, Ol. Pini Sylvest. Creosote, Terebene, a little chloroform, and Spt. Vin. Rect. After some days she expressed herself grateful for a feeling of relief and "warmth" about the chest after using the inhalation. It then occurred to me that if the inhalations could be made constant and continued by night as well as by day that the results would be bound to be proportionately greater. With this object in view I constructed a sort of awning of flannel stretched over a triangular frame, under which she slept very comfortably. The flannel was saturated with the inhalant. The expectoration at first increased, and the cough changed from a small hacking one, with which there was but little expectoration, to a freer cough with more expectoration.

After a month's treatment, my patient grew brighter, the appetite increased, the chest notes became clearer, and the crepitation less distinct. There was still dulness on percussion over the apex of the right lung, and at times I could detect pecteriloquy, as if a cavity had formed. In a few weeks more she was so much improved that I advised her to leave London, as it was then about Christmas time, and the fogs were particularly trying. She did so, taking with her the inhalant, &c. In May following she returned to London, and, to my great joy, and I must say surprise, I found her almost perfectly cured. I examined her chest, and found that a cavity had formed in the top of the right lung, but that it was dry. I urged her to still continue with the inhalant, sprinkling it on the pillow and spraying the bedroom with it at night. She then passed out of my hands, and I saw nothing more of her for two years, when she lived at Chertsey. There, in that rather damp locality, she spent two winters attending to her duties, and did not suffer any chest or throat inconvenience. She now resides at Wandsworth, not a robust woman—she never was very strong—but in good health, and entirely free from cough or any other symptom of lung disease.

The case of a soldier's daughter, *æt.* 18, home from India, I treated shortly after. This girl lived off the South Lambeth Road with her mother. She was extremely debilitated, suffered from amenorrhœa, and was rapidly losing weight. The lung symptoms were not so far advanced as in the case of Mrs. P——, and this girl had a better constitution. I first put her on what was practically the same treatment, but instead of Port or Burgundy, prescribed the St. Rapael Tannin Wine, an excellent preparation in cases of Anæmia associated with Phthisis.

She soon picked up, began to gain in weight, and before August—about six months from the time she first came under my care—was quite well. She has never suffered from any lung trouble since, and is now married.

Miss E——n, of Philadelphia, a handsome American girl, *æt.* 22, then travelling with her aunt, a New Jersey lady, came under my care at the Midland Grand Hotel, St. Pancras. At that time I was Surgeon to the Hotel, and saw Miss E——, who was on the way to Paris, to consult a physician to whom she had been recommended. She was extremely ill, and almost unfit to travel. On my recommendation they rested some days at the Hotel, the incessant travelling and hurrying about from one place to another being most fatiguing and injurious to her. Whether she had developed any phthisical symptoms before she left New York or not I was unable to discover, but certain it was that, though she was on her way to consult a Parisian authority on nervous diseases, she was then in a condition that might have led to early and rapid lung disease. Having explained the gravity of the case to Miss E——n's aunt, and assured her that the short cough, loss of weight, and other symptoms from which the patient suffered, were due entirely to lung trouble, she consented to stay at the Midland Hotel for some time under my treatment, and postpone the visit to the French physician. The weather at the time being beautifully fine, I encouraged daily drives to Hampstead and Highgate, where the patient was ordered to spend several hours every day walking and rusticating over the heath. The inhalant was used freely, being sprayed over the bed and sitting-rooms by day and night; dry inhalations were used frequently during the mornings, afternoons, and evenings. This patient revelled in the fragrant odours of the Pine and Eucalyptus, and declared that the treatment was "most delightful." Be that as it may, however, she soon began to get well, and in six weeks, instead of going to Paris "for her nerves," she went to Richmond, where she stayed another month, and then returned to America. Before her departure, in addition to a cheque for my attendance, she made me a very substantial present "for saving her life." Last year a friend of mine from Philadelphia assured me that she was in excellent health.

In September, 1890, I was asked by Dr. Stackpool, of Notting Hill, to see, in consultation with him, a banker's clerk who was then in the last stage of consumption. Dr. Stackpool assured me that "everything had been done" for the patient. "If, however," he remarked, "your Insufflation treatment will cure this man I shall thoroughly believe in it, as he is in the last stage of Phthisis." The case is interesting from several points of view, and shows that even in the most desperate cases great hope might be held out to patients if they do as this man did. From the time the treatment was explained to him and after using the instrument for a short time he became buoyed up with hope, and declared that he could now cure himself. After he had been a fortnight under treatment and had made such progress that astonished even myself, I enquired how often he

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used his Insufflator, and his mother assured me that after his rum-and-milk at 7 a.m., he commenced the inhalations and kept on for nearly two hours, then about one hour after breakfast he commenced again. Sitting up in bed with a book resting on his knees and propped up with pillows he would use his Insufflator for two or three hours at a stretch, and so on throughout the day in the afternoon and evening. His piquant remark that it was the first time he had had a chance of doing anything for himself was rather forcible. The following are some extracts from my note-book on this case. " William E. T——, of Princes Road, Notting Hill, aged 27. Had Pneumonia in March, 1889. Treated in St. George's Hospital, and discharged after three months with cough and expectoration of greenish yellow matter. Was subsequently attended by his employer's private medical attendant, Dr. S—— T——, of Upper Berkley St. Twelve months ago was compelled to give up his post at the bank, his employers generously allowing his pay to go on. He then removed to Princes Road; the cough and expectoration were "very bad" and he commenced to have night-sweats.

In September, 1890, when I saw him with Dr. Stackpool there were large cavities in the apices of both lungs, with all the characteristic physical signs and symptoms. There was great wasting of the body, the weight being reduced to 7st. 9lbs. The night-sweats were profuse and the expectoration was purulent and loaded with bacilli. He was then confined to bed all day. The patient was of a cheerful, energetic disposition, and readily grasped the fact that by constantly blowing the air charged with "Ozol" (distilled from Pine, Eucalyptus, Creolin, Iodoform and Guaiacol, etc.), into the lungs he would help to destroy the bacilli and heal the cavities in his lungs. In about four weeks from the commencement of the treatment I called one day to find Mr. T——not only out of bed but out of doors. His mother said in a very cheerful sort of way that he went to have an early dinner with a friend and would not return till five. On October 27th I made the following notes of the cure in my visiting-list. "Night-sweats gone. Expectoration almost nil; cavities dry; weight increased nearly a stone." Having no employment in London I then advised his mother to remove for the winter to Bournemouth where the patient continued to improve, and proposed going into business. This is the worst case of Pulmonary Consumption I have known to recover.

The great question here arises. Taking for granted that a patient suffers from Pulmonary Consumption, not in an extremely advanced stage, and is willing to follow out to the letter the directions given is there a reasonable prospect of effecting a cure? I answer "Most certainly," and I go further and say that not only is Consumption in a fairly advanced stage a curable disease, but when taken in the incipient stage it is the most curable of all diseases now looked upon as serious. That the proper germicidal treatment for Puerperal Fever, Typhus, Asiatic Cholera, Yellow Fever, and other acute diseases due to the presence of bacteria *in the blood* will in time be discovered, I am as firmly convinced as I am that Pulmonary Consumption is due to the presence of rod-shaped bacteriæ—bacilli—*in the lungs*, and that the cure of this affection can only be effected by the complete destruction of the bacilli in the lungs.

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